Report By:

National TAB
1329 E. KEMPER ROAD
SUITE 4210
CINCINNATI, OH 45246

Report: TAB

Function: Test, Adjust, & Balance

Date: 04/24/2025

Completed By: National TAB

PROJECT

8589 Hesperian & S St (Hayward CA)

20473 Hesperian Blvd

Hayward, CA 94541

Client

B&M Builders, Inc.

11330 Sunrise Park Drive

Suite C

Rancho Cordova, CA 95742

National TAB

Project: 8589 Hesperian & S St (Hayward CA)

Table Of Contents

CERTIFICATION

PROJECT: T-moble (Hayward, CA)

The data presented in this report is a record of system measurements and final adjustments that have been obtained in accordance with the current edition of the NEBB Procedural Standard for Testing, Adjusting and Balancing of Environmental Systems. The measurements shown, and the information given, in this report are certified to be accurate and complete, at the time and date information was gathered. Any variances from design quantities, which exceed NEBB tolerances, are noted in the TAB report project summary.

NEBB TAB FIRM:	National TAB - Kansas City
REGISTRATION NO:	3768
CERTIFIED BY:	Will Turnbough
DATE:	4/28/2025

Submitted and Certified by:

NEBB TAB FIRM:	National TAB - Kansas City
TAB PROFESSIONAL:	Will Turnbough
REGISTRATION NO:	CP-24289
CERTIFICATION EXP:	12/31/2025

Project Summary
The summary below provides a quick understanding of our scope of work and general testing procedures. Enclosed in the report are further details about your building performance including recommendations, asset data, and pictures. Our focus is to work with the trades to remedy any issues or deficiencies during the actual field balancing and not after the balancing has occurred to achieve a positive environment and outcome. The level of success is determined by the availability of the trades, possible parts needed, or time constraints.

RTU's (Roof Top Units) w/ Diffusers
Each of the RTU's were measured at their terminal devices or via traverse to establish a total flow for that unit. Each RTU was adjusted to within tolerance of the engineer's design flow. Each outlet was then adjusted to within tolerance of the design flow. Outside air was measured by reading the intake air opening with a velocity grid and multiplying by the free area. The outside air damper was adjusted until the airflow was within the design requirements. Any equipment that fell outside of that tolerance is noted throughout the report.

Ceiling Exhaust Fans
The ceiling exhaust fans were measured using a flow hood. If speed adjustment was provided, the fan speed was adjusted to within design tolerance. Any equipment that fell outside of this tolerance is noted throughout the report.

Final Building Tests
After completing the test and balance the final building pressure was measured. It was confirmed that the building pressure fell within acceptable tolerances of -0.02" wc to +0.02" wc and that the pressure measurement coincides with the actual and design net airflow. Any deviations from these standards are noted throughout the report.

Issue List

- RTU-1, 2, AND 3 DO NOT HAVE ECONOMIZER CONTROLLERS INSTALLED
- RTU-2 FAN AND HEATING ISSUES.

8589 Hesperian & S St (Hayward CA)

Project Issue Information

Issue Name : RTU-1, 2, AND 3 DO NOT HAVE ECONOMIZER CONTROLLERS INSTALLED

Description : RTU-1, 2, and 3 do not have economizer controllers installed. Units had to have OA manually set. Recommend to have controllers installed for proper operations.

Created By : National TAB

Assigned To : National TAB - Zack Eismin

Status : Pending

Priority : High

Asset Tag :

Originated Date : 04/24/2025 - Zack Eismin - National TAB

Project Issue File Details

04/24/2025

04/24/2025

8589 Hesperian & S St (Hayward CA)

Project Issue Information

Issue Name :	RTU-2 FAN AND HEATING ISSUES.		
Description :	RTU-2's fan will ramp up and down periodically causing inconsistent airflows. The unit also trips its internal transformer when heating is energized. Recommend to have unit serviced for proper operations.		
Created By :	National TAB	**Assigned To :**	National TAB - Zack Eismin
Status :	Pending		
Priority :	High	**Asset Tag :**	
Originated Date :	04/24/2025 - Zack Eismin - National TAB		

National TAB

Project: 8589 Hesperian & S St (Hayward CA)

System/Unit: AHU/RTU

Asset: RTU-1 AREA:

Unit Data		
	Design	**Actual**
MFG	EXISTING	CARRIER
Serial Num	-	2821C56577
Model Num	EXISTING	48FCL04A2A5A0A0C0
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1
OA Filter Size 1	-	28X14
Num PreFilter 1	-	2
PreFilter Size 1	-	16X25X2

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	-	NL
Motor Rpm	-	NL
Phase	3	1
Rated Voltage	208	208
Rated Amperage	-	5.1
Service Factor	-	NL

Test Data		
	Design	**Actual**
SF CFM	1200	1144
SF RPM	-	1447
RA CFM	1115	1063
OA CFM	85	81
RL Voltage	208	213
RL Amperage	-	2.71
VFD Max SetPt	-	N/A
VFD Min SetPt	-	N/A
SF Motor Freq(HZ)	-	N/A
OA Damper Position	-	~5% OPEN
Brake Horse Power	-	NA

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.24"
Fan Suction SP	-	-0.33"
Fan Discharge SP	-	0.20"
Total ESP	0.50	0.44"
Fan Total SP	-	0.53"
Cooling Coil P.D.	-	N/A

Completed By: Zack Eismin on 04/24/2025

Unit Data - PHOTO LOG

04/23/2025

National TAB

Project:8589 Hesperian & S St (Hayward CA)

AHU/RTU

Diffuser Supply (GRD)

RTU-1/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
SGRD1		A	8	150	266	153	102.0
SGRD2		A	8	200	221	183	91.5
SGRD3		A	10	350	392	323	92.3
SGRD4		A	10	350	460	340	97.1
SGRD5		B	8	150	350	145	96.7
Total				1200	1689	1144	95.33%

Diffuser Ret/Exh (GRD)

RTU-1/

Asset									
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**AK**	**CFM(1)**	**CFM(2)**	**FINAL CFM**	**% to design**
EGRD1		D	6X6	150	1	152	152	152	101.3
EGRD2		D	16X16	965	1	959	911	911	94.4
Total				1115		1111	1063	1063	95.34%

Completed By: Zack Eismin on 04/24/2025

National TAB

Project: 8589 Hesperian & S St (Hayward CA)

System/Unit: AHU/RTU

Asset: RTU-2 AREA:

Unit Data		
	Design	**Actual**
MFG	EXISTING	CARRIER
Serial Num	-	2821C56576
Model Num	EXISTING	48FCLA04A2A50A0C0
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1
OA Filter Size 1	-	28X14
Num PreFilter 1	-	2
PreFilter Size 1	-	16X25X2

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	-	NL
Motor Rpm	-	NL
Phase	3	1
Rated Voltage	208	208
Rated Amperage	-	5.1
Service Factor	-	NL

Test Data		
	Design	**Actual**
SF CFM	1200	1159
SF RPM	-	1456
RA CFM	990	952
OA CFM	210	207
RL Voltage	208	213
RL Amperage	-	2.36
VFD Max SetPt	-	N/A
VFD Min SetPt	-	N/A
SF Motor Freq(HZ)	-	N/A
OA Damper Position	-	~18%
Brake Horse Power	-	NA

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.32"
Fan Suction SP	-	-0.38"
Fan Discharge SP	-	0.19"
Total ESP	0.50	0.51"
Fan Total SP	-	0.57"
Cooling Coil P.D.	-	N/A

Completed By: Zack Eismin on 04/24/2025

Unit Data - PHOTO LOG

04/23/2025

National TAB

Project:8589 Hesperian & S St (Hayward CA)

AHU/RTU

Diffuser Supply (GRD)

RTU-2/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
SGRD1		E	12X8	150	211	154	102.7
SGRD2		E	12X8	150	191	142	94.7
SGRD3		E	12X8	150	122	153	102.0
SGRD4		E	12X8	150	131	139	92.7
SGRD5		E	12X8	150	177	137	91.3
SGRD6		E	12X8	150	121	142	94.7
SGRD7		E	12X8	150	111	151	100.7
SGRD8		E	12X8	150	77	141	94.0
Total				1200	1141	1159	96.58%

Completed By: Zack Eismin on 04/24/2025

National TAB

Project: 8589 Hesperian & S St (Hayward CA)

System/Unit: AHU/RTU

Asset: RTU-3 AREA:

Unit Data		
	Design	**Actual**
MFG	EXISTING	CARRIER
Serial Num	-	2821C56581
Model Num	EXISTING	48FCLA05A2A5A0A0C
Configuration	VERTICAL	VERTICAL
Num OA Filters 1	-	1
OA Filter Size 1	-	28X14
Num PreFilter 1	-	2
PreFilter Size 1	-	16X25X2

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	-	NL
Motor Rpm	-	NL
Phase	3	1
Rated Voltage	208	208
Rated Amperage	-	7.1
Service Factor	-	NL

Test Data		
	Design	**Actual**
SF CFM	1200	1212
SF RPM	-	1478
RA CFM	990	1001
OA CFM	210	211
RL Voltage	208	213
RL Amperage	-	3.01
VFD Max SetPt	-	N/A
VFD Min SetPt	-	N/A
SF Motor Freq(HZ)	-	N/A
OA Damper Position	-	~18% OPEN
Brake Horse Power	-	NA

Performance Data		
	Design	**Actual**
MA Plenum SP	-	-0.29"
Fan Suction SP	-	-0.39"
Fan Discharge SP	-	0.21"
Total ESP	0.50	0.50"
Fan Total SP	-	0.60"
Cooling Coil P.D.	-	N/A

Completed By: Zack Eismin on 04/24/2025

Unit Data - PHOTO LOG

04/23/2025

National TAB

Project:8589 Hesperian & S St (Hayward CA)

AHU/RTU

Diffuser Supply (GRD)

RTU-3/

Asset							
Asset Name	**Location**	**Type**	**Size**	**DESIGN CFM**	**CFM(1)**	**FINAL CFM**	**% to design**
SGRD1		E	12X8	150	159	157	104.7
SGRD2		E	12X8	150	162	140	93.3
SGRD3		E	12X8	150	169	153	102.0
SGRD4		E	12X8	150	133	161	107.3
SGRD5		E	12X8	150	177	137	91.3
SGRD6		E	12X8	150	131	144	96.0
SGRD7		E	12X8	150	141	163	108.7
SGRD8		E	12X8	150	150	157	104.7
Total				1200	1222	1212	101%

Completed By: Zack Eismin on 04/24/2025

National TAB

Project: 8589 Hesperian & S St (Hayward CA)

System/Unit: FAN - Exhaust

Asset: EF1 AREA:RR

Unit Data		
	Design	**Actual**
MFG	NA	BROAN
Model Num	NA	QTXE110150DCL-A
Serial Num	-	NL
Type	CEILING	CEILING

Test Data		
	Design	**Actual**
CFM	110	109
RL Voltage	208	NA
RL Amperage	-	NA
Discharge ESP	-	0.12"
Total ESP	0.1	0.12"

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	-	NL
Motor Rpm	-	NL
Phase	3	1
Voltage (rated)	208	120
Amperage (rated)	-	0.5
Service Factor	-	NL

Completed By: Zack Eismin on 04/23/2025

Unit Data - PHOTO LOG

04/23/2025

National TAB

Project: 8589 Hesperian & S St (Hayward CA)

System/Unit: FAN - Exhaust

Asset: EF2 AREA:RR

Unit Data		
	Design	**Actual**
MFG	NA	BROAN
Model Num	NA	QTXE110150DCL-A
Serial Num	-	NL
Type	CEILING	CEILING

Test Data		
	Design	**Actual**
CFM	110	111
RL Voltage	208	NA
RL Amperage	-	NA
Discharge ESP	-	0.13"
Total ESP	0.1	0.13"

Motor Data		
	Design	**Actual**
Motor MFG	-	NL
Frame	-	NL
Horsepower	-	NL
Motor Rpm	-	NL
Phase	3	1
Voltage (rated)	208	120
Amperage (rated)	-	0.5
Service Factor	-	NL

Completed By: Zack Eismin on 04/23/2025

Unit Data - PHOTO LOG

04/23/2025

Abbreviation List

A = Area (ft^2)	S.F. = Service Factor
AHU = Air Handling Unit	SF = Supply Fan
A_k = Effective Area	SP = Static Pressure
BHP = Brake Horsepower (IP) HP	SR = Supply Register
Btu = British Thermal Unit	T = Temperature
Btu/h = Btuh = BTUH = BTU/Hour	T_{ma} = Mixed Air Temperature
CL = Center Distance (used in belt formula)	T_{oa} = Outside Air Temperature
CD = Ceiling Diffuser	T_{ra} = Return Air Temperature
CF = Correction Factor	H = Head (in wc, ft wc, psi)
CFM = Volumetric Flow: Cubic Feet Per Minute	h = Enthalpy
CO2 = Carbon Dioxide	HP = Horsepower
CO = Carbon Monoxide	hr = Hour
C_v = Flow Constant	K_v = Flow constant (SI)
d = Diameter (in.) IP	kW = Kilowatt = 1000 Watts
Δ = Difference or Change (Final - Initial)	LAT = Leaving Air Temperature
DB = Dry Bulb	lb = Pounds
EA = Exhaust Air	LWT = Leaving Water Temperature
EAT = Entering Air Temperature	ma = Mixed Air
EF = Exhaust Fan	MIN = Minimum
Eff = Efficiency	MAX = Maximum
EG = Exhaust Grille	N/A = Not Applicable
ESP = External Static Pressure	NA = No Access
EWT = Entering Water Temperature	NL = Not Listed
°F = Degrees Fahrenheit, °F	NPSHA = Net Positive Suction Head Available
FPB = Fan Powered Box	NS = Not Specified
FLA = Full Load Amps	OA = Outside Air
fpm = Feet per Minute (fpm)	OAT = Outside Air Temperature
ft = Foot	PD = Sheave Pitch Diameter
gal = Gallons	P.D. = Pressure Drop
GPM = Gallons Per Minute (GPM)	PF = Power Factor
h = Enthalpy (BTU/lb dry air)	SG = Supply Grille
P = Pressure	SR = Supply Register
ppm = parts per million	TP = Total Pressure
psi = Pounds Per Square Inch	T_{ra} = Return Air Temperature
psid = PSI Differential	TS = Tip Speed (fpm) IP, (m/s) SI
r = Radius (in)	TSP = Total Static Pressure
$\%_{ra}$ = % of Return Air	V = Velocity
RA = Return Air	VAV = Variable Air Volume
RAT = Return Air Temperature	VD = Volume Damper
RF = Return Fan	VFD = Variable Frequency Drive
RG = Return Grille	W = Watt
RH = Relative Humidity	WB = Wet Bulb
RPM = Revolutions Per Minute	wg = wc = water gauge = water column
RTU = Roof Top Unit	WHP = Water Horsepower (IP)
SA = Supply Air	ω = Humidity Ratio